

WHAT IS CLAIMED IS:

1. An exposure apparatus used in a lithography process, said exposure apparatus comprising:

an exposure-apparatus main body provided on a floor
5 surface;

a laser unit, as an exposure light source, arranged in an area of said floor surface, the width of said area being defined by maintenance areas, on both sides of said exposure-apparatus main body, inclusive.

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2. An exposure apparatus according to claim 1, wherein said exposure-apparatus main body and said laser unit are so arranged on said floor surface that maintenance areas of said exposure-apparatus main body
15 and said laser unit overlap each other at least partially.

3. An exposure apparatus according to claim 2, wherein said exposure-apparatus main body and said laser unit are so arranged on said floor surface that a whole
20 maintenance area of said laser unit is included in a maintenance area of said exposure-apparatus main body.

4. An exposure apparatus according to claim 1, wherein a housing of said laser unit is arranged on said
25 floor surface and adjacent to a housing of said exposure-apparatus main body.

5. An exposure apparatus according to claim 1,

wherein a housing of said laser unit is directly connected to a housing of said exposure-apparatus main body.

5 6. An exposure apparatus according to claim 1, wherein said laser unit is connected through a guide optical system to said exposure-apparatus main body.

10 7. An exposure apparatus according to claim 6, wherein said guide optical system is arranged below a floor surface on which said exposure-apparatus main body is provided.

15 8. An exposure apparatus according to claim 1, wherein a substrate-processing unit can be connected inline with a side of said exposure-apparatus main body reverse to said laser unit.

20 9. An exposure apparatus according to claim 8, wherein said substrate-processing unit can be connected through an inline-interface portion with said exposure-apparatus main body.

25 10. An exposure apparatus according to claim 9, wherein said inline-interface portion is detachable from said exposure-apparatus main body.

11. An exposure apparatus according to claim 9,

wherein said exposure-apparatus main body and said laser unit are so arranged on said floor surface that maintenance areas of said exposure-apparatus main body and said laser unit overlap each other at least partially.

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12. An exposure apparatus according to claim 8, wherein, near the end surface of a side of said exposure-apparatus main body, to which side said substrate-processing unit is connected, a delivery port is arranged to and from which a mask container containing a mask is transported by a ceiling-transport system that moves along a rail extending on a ceiling opposite to said floor surface.

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13. An exposure apparatus according to claim 12, wherein, said mask container is a sealed-type container having a lid that can be opened and closed.

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14. A lithography system comprising:
an exposure apparatus according to claim 1; and
a substrate-processing unit that is arranged on a side of, said exposure-apparatus main body, reverse to said laser unit and is connected in-line with said exposure-apparatus main body.

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15. A lithography system according to claim 14, wherein said substrate-processing unit is a coater-developer.

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16. A device manufacturing method including a lithography process, wherein in said lithography process, exposure is performed using an exposure apparatus
5 according to claim 1.

17. An exposure apparatus used in a lithography process, said exposure apparatus comprising:
an exposure-apparatus main body provided on a floor
10 surface;
a laser unit as an exposure light source, which is so arranged on said floor surface that a maintenance area of said exposure-apparatus main body and a maintenance area of said laser unit overlap each other at least
15 partially.

18. An exposure apparatus according to claim 17, wherein said exposure-apparatus main body and said laser unit are so arranged on said floor surface that a whole
20 maintenance area of said laser unit is included in a maintenance area of said exposure-apparatus main body.

19. An exposure apparatus according to claim 17, wherein said exposure-apparatus main body and said laser
25 unit are arranged in-line along a longitudinal direction of said exposure-apparatus main body on said floor surface.

20. An exposure apparatus according to claim 17, wherein a housing of said laser unit is arranged on said floor surface and adjacent to a housing of said exposure-apparatus main body.

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21. An exposure apparatus according to claim 17, wherein a housing of said laser unit is directly connected to a housing of said exposure-apparatus main body.

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22. An exposure apparatus according to claim 21, wherein said laser unit is so arranged on said floor surface that a longitudinal direction of said laser unit coincides with a longitudinal direction of said exposure-apparatus main body.

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23. An exposure apparatus according to claim 22, wherein said laser unit is any one of an ArF excimer laser unit having an oscillation wavelength of 193nm, a F₂ laser unit and a laser plasma unit.

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24. An exposure apparatus according to claim 17, wherein said laser unit is connected through a guide optical system to said exposure-apparatus main body.

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25. An exposure apparatus according to claim 24, wherein said guide optical system is arranged below a floor surface on which said exposure-apparatus main body

is provided.

26. A lithography system comprising:

an exposure apparatus according to claim 17; and

5 a substrate-processing unit that is arranged on a side of, said exposure-apparatus main body, reverse to said laser unit and is connected in-line with said exposure-apparatus main body.

10 27. A lithography system according to claim 26, wherein said substrate-processing unit is a coater-developer.

15 28. A device manufacturing method including a lithography process, wherein in said lithography process, exposure is performed using an exposure apparatus according to claim 17.

20 29. An exposure apparatus connected in-line with a substrate-processing unit, said exposure apparatus comprising:

an exposure-apparatus main body that transfers a pattern of a mask onto a substrate through a projection optical system and to the front surface of which said substrate-processing unit can be connected, said front surface being an end surface in a longitudinal direction of said exposure-apparatus main body, and

wherein, in a side of said exposure-apparatus main

body, which side is in front of an optical axis of said projection optical system and to which side said substrate-processing unit is connected, a delivery port is arranged into and from which said mask contained in a mask container is loaded and unloaded by a ceiling-transport system that moves along a rail extending on a ceiling opposite to said floor surface on which said exposure-apparatus main body is provided.

10 30. An exposure apparatus according to claim 29, wherein said exposure-apparatus main body can be connected with an end of an inline-interface portion, another end of which is connected with said substrate-processing unit.

15 31. An exposure apparatus according to claim 30, wherein said end of said inline-interface portion is detachable from said exposure-apparatus main body.

20 32. An exposure apparatus according to claim 29, wherein at least two mask containers that are the same as said mask container can be placed along a rail of said ceiling-transport system in said delivery port.

25 33. An exposure apparatus according to claim 29, wherein said delivery port is arranged at a height of about 900mm from a floor surface.

34. An exposure apparatus according to claim 29,
wherein a laser unit as an exposure light source is
connected to an end surface of said exposure-apparatus
main body reverse to said front surface to which said
5 substrate-processing unit is connected.

35. An exposure apparatus according to claim 34,
wherein said laser unit is attended by an illumination
optical system.

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36. A device manufacturing method including a
lithography process, wherein in said lithography process,
exposure is performed using an exposure apparatus
according to claim 29.

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37. An exposure apparatus comprising:

an exposure-apparatus main body that transfers a
pattern of a mask onto a substrate;

a mask-container storeroom having a carrying-in
20 port, for a mask container, into which said mask
contained in a mask container is carried;

a transport mechanism that transports said mask
container carried in between said carrying-in port and a
position in which to deliver a mask to a conveying system
25 of said exposure-apparatus main body side; and

an orientation-change unit that is arranged in part
of a path of said transport mechanism transporting said
mask container and changes the orientation of said mask

container.

38. An exposure apparatus according to claim 37,
wherein said orientation-change unit comprises a
5 turntable on which said mask container is mounted, and a
driving mechanism that rotates said turntable.

39. An exposure apparatus according to claim 38,
wherein said orientation-change unit is arranged on the
10 ceiling of said mask-container storeroom.

40. An exposure apparatus according to claim 38,
further comprising:

an orientation-detection mechanism that detects the
15 orientation of said mask container mounted on said
turntable, and

wherein said driving mechanism sets an angle
through which said turntable is to be rotated, based on
detection results of said orientation-detection mechanism.

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41. An exposure apparatus according to claim 37,
wherein said turntable has a kinematic support structure
that supports said mask container at a point, line and
plane.

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42. An exposure apparatus according to claim 37,
wherein said carrying-in port is a delivery port which is
provided on the ceiling of said mask-container storeroom,

and to which said mask container is delivered by a ceiling-transport system transporting said mask contained said mask container.

5 43. An exposure apparatus according to claim 42, wherein at least two mask containers that are the same as said mask container can be placed in-line along a rail of said ceiling-transport system in said delivery port.

10 44. An exposure apparatus according to claim 43, wherein said orientation-change unit changes individually orientations of mask containers that are placed in said delivery port.

15 45. An exposure apparatus according to claim 37, wherein said carrying-in port is an in-out port provided in a side surface of said mask-container storeroom.

20 46. An exposure apparatus according to claim 37, wherein said mask container has an opening, and said orientation-change unit changes the orientation of said mask container according to the direction of said opening.

25 47. An exposure apparatus according to claim 46, wherein said mask container has a lid that can close said opening.

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an exposure apparatus that is provided on a floor surface of said clean room and transfers a pattern of a mask onto a substrate through a projection optical

a substrate-processing unit that is arranged on the front side of said exposure apparatus on said floor surface and is connected in-line with said exposure apparatus, said front side being seen in a longitudinal

a first ceiling-transport system that moves along a first rail extending in a predetermined direction on a ceiling of said clean room, and

wherein between an optical axis of said projection
15 optical system and said substrate-processing unit, a
delivery port is arranged into and from which said mask
contained in a mask container is loaded and unloaded by
said first ceiling-transport system.

20 49. A lithography system according to claim 48,
further comprising:

a second ceiling-transport system that moves along a second rail extending parallel to said first rail on said ceiling and transports said substrate contained in a substrate container from and to said substrate-processing unit.

50. A lithography system according to claim 49,

wherein said first and second rails extend in a direction substantially perpendicular to the longitudinal direction of said exposure apparatus.

5 51. A lithography system according to claim 50, wherein at least two mask containers that are the same as said mask container can be placed in-line along said first rail in said delivery port.

10 52. A lithography system according to claim 49, wherein said substrate container is a sealed-type container having a lid that can be opened and closed.

15 53. A lithography system according to claim 48, wherein maintenance of said exposure apparatus can be performed from at least both sides thereof.

 54. A lithography system according to claim 48, further comprising:

20 an inline-interface portion that is arranged between said exposure apparatus and said substrate-processing unit and that connects the both.

 55. A lithography system according to claim 54, further comprising:

 a mask-transport-system housing that is arranged parallel to said inline-interface portion and has said mask-transport system therein, and

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wherein said delivery port is arranged on the ceiling of a mask-transport-system housing.

56. A lithography system according to claim 55,
5 wherein said first rail extends in a direction substantially perpendicular to the longitudinal direction of said exposure apparatus, and

wherein at least two mask containers that are the same as said mask container can be placed in-line along
10 said first rail in said delivery port.

57. A lithography system according to claim 55,
wherein one side of said mask-transport-system housing is in the substantially same plane as one side of said
15 exposure apparatus is, and wherein a in-out port for said mask container is provided in said one side of said mask-transport-system housing.

58. A lithography system according to claim 55,
20 further comprising:

a substrate-container-extension housing that is arranged adjacent to said mask-transport-system housing and parallel to said inline-interface portion and has an extension port for a substrate container containing said
25 substrate.

59. A lithography system according to claim 58,
wherein one side of said substrate-container-extension

housing is in the substantially same plane as one side of said exposure apparatus and one side of said mask-transport-system housing are, wherein an extension port for said substrate container is provided in said one side of said substrate-container-extension housing, and wherein an in-out port for said mask container is provided in said one side of said mask-transport-system housing.

60. A lithography system according to claim 59, wherein said extension port and said in-out port are arranged at the same predetermined height from a floor surface.

61. A lithography system according to claim 55, wherein said mask-transport system inside said mask-transport-system housing transports said mask container that was carried in by said first ceiling-transport system between said delivery port and said position in which to deliver a mask to a conveying system of said exposure apparatus side, further comprising:

an orientation-change unit that changes the orientation of said mask container to be suitable to deliver a mask to said conveying system of said exposure apparatus side in said delivery position before the transport of said mask container to said delivery position.

62. A lithography system according to claim 61,
wherein said orientation-change unit changes the
orientation of said mask container during transport by
5 said first ceiling-transport system.

63. A lithography system according to claim 61,
wherein said orientation-change unit changes the
orientation of said mask container while said mask is
10 transported by a conveying system in said mask-transport-
system housing.

64. A lithography system according to claim 55,
wherein said mask-transport-system housing is detachable.
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65. A lithography system according to claim 54,
further comprising:

a substrate-container-extension housing that is
arranged parallel to said inline-interface portion and
20 has an extension port for a substrate container
containing said substrate.

66. A lithography system according to claim 65,
wherein one side of said substrate-container-extension
25 housing is in the substantially same plane as one side of
said exposure apparatus is, and wherein an extension port
for said substrate container is provided in said one side
of said substrate-container-extension housing.

67. A lithography system according to claim 66, wherein an in-out port for said mask container is provided on said one side of said exposure apparatus.

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68. A lithography system according to claim 67, wherein said extension port and said in-out port are arranged at the same predetermined height from a floor surface.

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69. A lithography system according to claim 65, wherein said substrate-container-extension housing is detachable.

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70. A lithography system according to claim 54, wherein said inline-interface portion is detachable.

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71. A lithography system according to claim 48, wherein a laser unit as an exposure light source is connected to an end surface of said exposure apparatus reverse to said front surface to which said substrate-processing unit is connected.

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72. A lithography system according to claim 71, wherein said laser unit is attended by an illumination optical system.

73. A lithography system according to claim 48,

wherein said delivery port is arranged at a height of about 900mm from a floor surface.

74. A lithography system according to claim 48,
5 wherein said mask container is a sealed-type container having a lid that can be opened and closed.

75. A lithography system according to claim 74,
10 wherein said mask container is a bottom-open-type and sealed-type container.

76. A device manufacturing method including a lithography process, wherein in said lithography process,
15 a lithography system according to claim 48 is used.

77. A lithography system used in a clean room comprising:

an exposure apparatus that is provided on a floor surface of said clean room and transfers a pattern of a
20 mask onto a substrate through a projection optical system;

a substrate-processing unit that is connected in-line with said exposure apparatus; and

a first ceiling-transport system that moves along a
25 first rail extending in a predetermined direction on a ceiling of said clean room, and

wherein below said first rail, a delivery port is arranged into and from which said mask contained in a

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mask container is loaded and unloaded by said first ceiling-transport system, and on which at least two mask containers can be placed along said first rail.

5 78. A lithography system according to claim 77, further comprising:

 a second ceiling-transport system that moves along a second rail extending parallel to said first rail on said ceiling and transports said substrate contained in a
10 substrate container from and to said substrate-processing unit.

 79. A lithography system according to claim 78, wherein said substrate container is a sealed-type
15 container having a lid that can be opened and closed.

 80. A lithography system according to claim 77, wherein said delivery port is provided in said exposure
20 apparatus.

 81. A lithography system according to claim 77, further comprising:

 a mask-transport-system housing in which a conveying system for a mask contained said mask container
25 is provided, and

 wherein said delivery port is provided in said mask-transport-system housing.

82. A lithography system according to claim 81,
wherein said mask-transport system inside said mask-
transport-system housing transports said mask container
that was carried in by said first ceiling-transport
5 system from said delivery port to said position in which
to deliver a mask to a conveying system of said exposure
apparatus side,
further comprising:

an orientation-change unit that changes the
10 orientation of said mask container to be suitable to
deliver a mask to said conveying system of said exposure
apparatus side in said delivery position before the
transport of said mask container to said delivery
position.

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83. A lithography system according to claim 82,
wherein said orientation-change unit changes the
orientation of said mask container during transport by
said first ceiling-transport system.

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84. A lithography system according to claim 82,
wherein said orientation-change unit changes the
orientation of said mask container while said mask is
transported by a conveying system in said mask-transport-
25 system housing.

85. A lithography system according to claim 77,
wherein said delivery port is arranged below said first

86. A lithography system according to claim 77,
wherein said delivery port is arranged at a height of
5 about 900mm from a floor surface.

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90. A lithography system used in a clean room
20 comprising:

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a mask-container storeroom that has a delivery port

into and from which said mask contained in said mask container is loaded and unloaded by said ceiling-transport system on the ceiling thereof;

5 a transport mechanism that transports said mask container carried in between said delivery port and said position in which to deliver a mask to a conveying system of said exposure apparatus side; and

10 an orientation-change mechanism that changes the orientation of said mask container to be suitable to deliver a mask to said conveying system of said exposure apparatus side in said delivery position before the transport of said mask container to said delivery position.

15 91. A lithography system according to claim 90, wherein said orientation-change mechanism changes the orientation of said mask container during transport by said ceiling-transport system.

20 92. A lithography system according to claim 90, wherein said orientation-change mechanism changes the orientation of said mask container during transport by said transport mechanism.

25 93. A lithography system according to claim 92, wherein said orientation-change mechanism is arranged in part of a path of said transport mechanism transporting said mask container.

94. A lithography system according to claim 93,
wherein said orientation-change mechanism comprises a
turntable on which said mask container is mounted, and a
5 driving mechanism that rotates said turntable.

95. A lithography system according to claim 94,
further comprising:

an orientation-detection mechanism that detects the
10 orientation of said mask container mounted on said
turntable, and

wherein said driving mechanism sets an angle
through which said turntable is to be rotated, based on
detection results of said orientation-detection mechanism.
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96. A lithography system according to claim 90,
wherein said orientation-change mechanism is arranged in
said delivery port.

97. A lithography system according to claim 90,
wherein said mask container has an opening, and said
orientation-change mechanism changes the orientation of
said mask container according to the direction of said
opening.
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98. A lithography system according to claim 97,
wherein said mask container has a lid that can close said
opening.

99. A device manufacturing method including a lithography process, wherein in said lithography process, a lithography system according to claim 90 is used.

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100. A lithography system used in a clean room comprising:

a plurality of exposure apparatuses that are provided on a floor surface of said clean room and transfer a pattern of a mask onto a substrate through a projection optical system;

a ceiling-transport system that moves along a rail extending on the ceiling of said clean room and transports said mask contained in a mask container; and
15 an orientation-setting mechanism that is provided on said ceiling-transport system, and, before carrying into each of said exposure apparatuses, sets the orientation of said mask container to be suitable for said exposure apparatus.

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101. A lithography system according to claim 100, wherein said orientation-setting mechanism sets the orientation of said mask container based on information, stored beforehand, concerning orientation suitable for
25 each exposure apparatus.

102. A lithography system according to claim 100, wherein said orientation-setting mechanism sets the

orientation of said mask container according to an instruction from a host unit.

103. A lithography system according to claim 100,
5 wherein said orientation-setting mechanism sets the
orientation of said mask container based on communication
results with each of said exposure apparatus.

104. A lithography system according to claim 100,
10 wherein said mask container has an opening, and said
orientation-setting mechanism sets the orientation of
said mask container according to the direction of said
opening.

15 105. A lithography system according to claim 104,
wherein said mask container has a lid that can close said
opening.

106. A transport method with which to transport a
20 container containing an object to be conveyed from a
first position to a second position in which said object
to be conveyed is delivered,

wherein during said transport, the orientation of
said container is set according to a direction in which
25 said object is delivered in said second position.

107. A transport method according to claim 106,
wherein said object to be conveyed is a mask having a

pattern formed thereon.

108. A transport method according to claim 106,
wherein said object to be conveyed is a substrate subject
5 to exposure onto which a predetermined pattern is
transferred.

109. A transport method according to claim 106,
wherein said container has an opening, and the
10 orientation of said container is set according to the
direction of said opening.

110. A transport method according to claim 109,
wherein said container has a lid that can close said
15 opening.

111. An exposure apparatus comprising:
an exposure-apparatus main body that transfers a
pattern of a mask onto a substrate;
20 a mask-container storeroom having a carrying-in
port, for a mask container, into which a mask container
containing said mask is carried from a position apart
from said exposure-apparatus main body;
a transport mechanism that transports said mask
25 container carried in between said carrying-in port and a
position in which to deliver a mask to a conveying system
of said exposure-apparatus main body side; and
an orientation-change unit that is arranged in part

of a path of said transport mechanism transporting said mask container and changes the orientation of said mask container.

5 112. An exposure apparatus according to claim 111, wherein said carrying-in port is a port into which said mask container is carried when an operator transfers a mask container containing said mask from said position apart from said exposure-apparatus main body.

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113. An exposure apparatus according to claim 111, further comprising:

 a transport system that transports a mask container containing said mask from a position apart from said
15 mask-container storeroom to said carrying-in port.

114. An exposure apparatus according to claim 111, wherein said mask container has an opening, and said orientation-change unit changes the orientation of said
20 mask container according to the direction of said opening.

115. An exposure apparatus according to claim 114, wherein said mask container has a lid that can close said opening.

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116. A transport method with which to transport a container containing an object to be conveyed from a first position apart from an exposure-apparatus main body

to a second position in which said object to be conveyed
is delivered,

wherein during said transport, the orientation of
said container is set according to a direction in which
5 said object is delivered in said second position.

117. A transport method according to claim 116,
wherein an operator carries a container containing said
object to be conveyed from said first position to said
10 second position.

118. A transport method according to claim 116,
wherein a transport mechanism transports a container
containing said object to be conveyed from said first
15 position to said second position.

119. A transport method according to claim 116,
wherein said mask container has an opening, and said
orientation-change unit changes the orientation of said
20 mask container according to the direction of said opening.

120. A transport method according to claim 119,
wherein said mask container has a lid that can close said
opening.